

2.2 Ecological Framework

This section is intended to provide readers with a general overview of Wisconsin's ecological diversity at both landscape and habitat levels. It describes the different ecological regions of the state and identifies the natural communities that are or have the potential to be associated with those ecological regions.

2.2.1 Overview of the Ecological Landscapes of Wisconsin

The Department of Natural Resources adopted a classification system (based on the system known as the National Hierarchical Framework of Ecological Units which was developed by the US Forest Service and many collaborators) to consistently organize its land-based ecological planning, management, and monitoring activities. This system divides the state into 16 ecologically similar regions, based on climate, soils, existing and pre-settlement vegetation, topography, types of aquatic features present, and other factors (Figure 2-1). Referred to as "Ecological Landscapes," they each have their own "look and feel." They also have unique sets of conservation needs and opportunities. They differ in levels of biological productivity, habitat suitability for wildlife, presence of rare species and natural communities, and in many other ways that affect land use and management.

The distribution and abundance of plants and animals across the state has been, and continues to be, determined by both natural factors and human-induced disturbance patterns.

Historically, many species reached the edge of their range in a narrow band that runs from northwestern to southeastern Wisconsin. This narrow band, known as the "Tension" or "Transition" Zone, separates the northern forest (including the boreal forest) from the southern forest and prairies (Figure 2-2).

Information presented in Section 2.2.3 is taken largely from *Ecological Landscapes of Wisconsin* (Wisconsin DNR 2004a). This web-based resource provides an assessment of each Ecological Landscape, including its ecological, social, and economic characteristics. It also identifies opportunities to manage resources with consideration for long-term ecological and economic sustainability. The information is used by natural resource managers as a reference to help assess the ecological resources and opportunities that exist within the state and in the Ecological Landscapes where they work. This resource was developed collaboratively by DNR staff. It is periodically updated and can be viewed at <http://dnr.wi.gov/landscapes/>. This web site also contains maps of original vegetation, current land cover, landtype association, public land ownership, and water features for each landscape.

The 16 Ecological Landscapes are described below working from the northwest part of the state to the southeast; first, north of the Tension Zone, and then south. Although many Species of Greatest



Figure 2-1. Ecological Landscapes of Wisconsin.

Conservation Need tend to be associated with certain areas of the state based on ecological characteristics, only rarely are their ranges concurrent with the Ecological Landscape boundaries described in this chapter. Part of each of the following 16 write-ups are lists of species with high, moderate, or low probabilities of occurring in the Ecological Landscape. This categorization of “probability of occurrence” is not intended to imply that a species occurs throughout the Ecological Landscape, but rather that the species occurs somewhere within it. This is particularly evident in the larger landscapes such as the North Central Forest, Forest Transition, West Central Coulee and Ridges, and Southeast Glacial Plains.

2.2.2 Overview of the Natural Communities in Wisconsin

As one travels around the state, it is apparent that Wisconsin harbors a wide variety of terrestrial and aquatic habitats. From the thousands of small lakes in Vilas and Oneida Counties to the steep, wooded valleys and spring creeks of the Driftless Area to the gently rolling, productive farmland along the Rock River, the state contains a remarkable diversity of lands and waters.

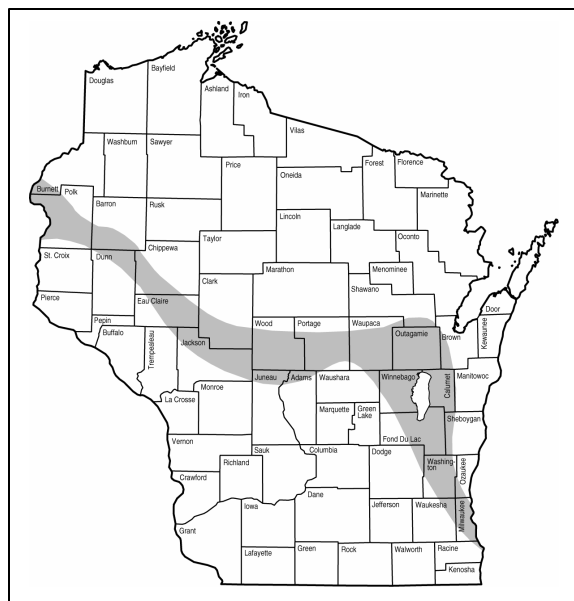


Figure 2-2. Tension Zone in Wisconsin.

Of course, no two places are the same; each forest, wetland, grassland, stream, and lake contains a unique collection of plants and animals. But, based on environmental conditions and ecological processes, similar habitats support similar collections of species. For example, areas of native vegetation in the southern part of the state that are south-facing, have well-drained and reasonably fertile soils, and are subject to frequent fires often harbor scattered bur and white oak trees amidst a variety of native grasses and forbs. Ecologists refer to collections of native plants and animals that consistently occur together under similar conditions as “natural communities.” *The Vegetation of Wisconsin* (Curtis 1959) described a novel way to determine natural communities based on plant associations and it remains the foundation from which most ecologists in the state categorize groups of species. Curtis focused on terrestrial and wetland communities, but did not address aquatic systems.

The DNR’s Natural Heritage Inventory (NHI) has expanded and refined Curtis’ original classification of terrestrial and wetland-related natural communities in Wisconsin. In this report, 58 NHI natural communities, 1 surrogate community (taken from the report, *Managing Habitat for Grassland Birds: A guide for Wisconsin*), and 8 aquatic community types (developed by DNR fishery researchers for use in this plan) are used. They are listed in Table 2-1. *Section 3.3 provides detailed descriptions of these communities as well as listings of the Species of Greatest Conservation Need associated with each.*

Different natural communities occur in different parts of the state and as a result there are different opportunities to sustain these communities in different Ecological Landscapes. “Sustain” means ensuring that a given natural community type will be present and has high potential to maintain its natural composition, structure, and ecological function over a long period of time (e.g., 100 years). Estimating the likely degree of sustainability requires looking at each natural community type from an Ecological Landscape perspective across the state or region to determine whether occurrences of communities are large enough and/or connected enough to support the composition, structure, and ecological function of a community type over time. ***An key objective of sustaining natural communities is to manage for natural community types that historically occurred in a given Ecological Landscape and to have all***

seral stages of a community type represented to accommodate wildlife species that require early and/or late successional habitat stages in order to complete their life history cycle.

This goal of sustainability does not preclude a “working landscape” where both traditional (e.g., forest and agricultural products) and non-traditional (e.g., ginseng, sphagnum moss, etc.) products are extracted from an area. People are dependent on natural resources economically and physically, so to maintain economic sustainability over the long term, natural resources must be sustained. Such a philosophy allows for human use so long as the capacity for self-renewal of natural resources is not compromised. However, removing natural resources in an unsustainable way will diminish natural communities, our economy, and the human population over the long term.

Table 2-2 provides a quick way of identifying which Ecological Landscapes provide the best opportunities for sustaining the natural communities that occur in Wisconsin. It can help guide land and water management activities (including active management for product extraction and recreation, preservation, and restoration of degraded or missing natural communities) to ensure that they are compatible with the local ecology of the Ecological Landscape and also maintain important components of ecological diversity and function. It should help identify the most appropriate community types that could be considered for management activities within each Ecological Landscape. Therefore, this table is intended for broad land and water management applications. This table is not intended to suggest that entire Ecological Landscapes should be restored to historic conditions or that current management regimes are successfully sustaining natural communities. It is intended to illustrate what parts of the state may provide the most effective opportunities to sustain natural communities as landowners and managers strive to meet the needs of both people and diverse sustainable ecosystems.

Opportunities are defined as follows:

Major Opportunity - A major opportunity for sustaining the natural community in the Ecological Landscape exists, either because many significant occurrences of the natural community have been recorded in the landscape or major restoration activities are likely to be successful maintaining the community's composition, structure, and ecological function over a long period of time.

Important Opportunity - Although the natural community does not occur extensively or commonly in the Ecological Landscape, one to several significant occurrences do occur and are important in sustaining the community in the state. In some cases, important opportunities may exist because the natural community may be restricted to just one or a few Ecological Landscapes within the state and there may be a lack of opportunities elsewhere.

Present - The natural community occurs in the Ecological Landscape, but better management opportunities appear to exist in other parts of the state.

Absent - The natural community is not known to occur in the Ecological Landscape.

More information about natural communities in Wisconsin is available at the DNR's web site at <http://dnr.wi.gov/org/land/er/communities/>.

2.2.3 Ecological Landscape Descriptions

Starting on the following pages are individual descriptions of the 16 Ecological Landscapes in Wisconsin, including lists of the natural communities occurring within each Ecological Landscape. *Section 3.2 contains the lists of Species of Greatest Conservation Need occurring within each Ecological Landscape*

as well as those species-community combinations within each Ecological Landscape that are considered highest ecological priority.

Table 2-1. Natural and surrogate communities in Wisconsin used in this report.

<p><i>Northern Forest natural communities</i></p> <p>Boreal Forest Northern Dry Forest Northern Dry-Mesic Forest Northern Mesic Forest Northern Wet-Mesic Forest Northern Wet Forest Northern Hardwood Swamp</p>	<p><i>Southern Forest natural communities</i></p> <p>Hemlock Relict Pine Relict Central Sands Pine-Oak Forest Southern Dry Forest Southern Dry-Mesic Forest Southern Mesic Forest Southern Tamarack Swamp White Pine-Red Maple Swamp Floodplain Forest Southern Hardwood Swamp</p>
<p><i>Open and Shrub Wetland natural communities</i></p> <p>Alder Thicket Bog Relict Boreal Rich Fen Calcareous Fen Coastal Plain Marsh Ephemeral Pond Great Lakes Coastal Fen Interdunal Wetland Northern Sedge Meadow Open Bog Shrub Carr Southern Sedge Meadow</p>	<p><i>Oak Savanna natural communities</i></p> <p>Cedar Glade Oak Opening Oak Woodland</p>
<p><i>Aquatic natural communities</i></p> <p>Emergent Aquatic Emergent Aquatic-Wild Rice Submergent Aquatic Submergent Aquatic-Oligotrophic Marsh</p>	<p><i>Oak/Pine Barrens natural communities</i></p> <p>Great Lakes Barrens Oak Barrens Pine Barrens</p>
<p><i>Natural communities based on geologic features</i></p> <p>Algific Talus Slope Alkaline Clay Bluff Alvar Bedrock Glade Dry Cliff Forested Ridge and Swale Great Lakes Rockshore Great Lakes Beach Great Lakes Dune Inland Beach Moist Cliff</p>	<p><i>Grassland natural communities</i></p> <p>Bracken Grassland Sand Prairie Dry Prairie Dry-Mesic Prairie Mesic Prairie Wet-Mesic Prairie Wet Prairie</p>
	<p><i>Hydrologic-based natural communities</i></p> <p>Coldwater Streams Coolwater Streams Lake Michigan Lake Superior Impoundments/Reservoirs Inland Lakes Warmwater Rivers Warmwater Streams</p>
	<p><i>Surrogate communities</i></p> <p>Surrogate Grassland (e.g., Conservation Reserve Program, pasture, hay, etc.)</p>

Table 2-2. Opportunities for sustaining Wisconsin's natural communities by Ecological Landscape.

		Superior Coastal Plain*	Northwest Lowlands	Northwest Sands*	North Central Forest*	Northern Highland*	Forest Transition*	Northeast Sands	Northern Lake Mich.	Central Lake Mich.	Western Prairie	Western Coulee and	Southwest Savanna	Central Sand Plains	Central Sand Hills*	Southeast Glacial Plains	Southern Lake Mich.
Northern Forest Communities	Boreal Forest	3	2		2	1		1	2								
	Northern Dry Forest	2	1	3	1	2		3	2					2	1		
	Northern Dry-Mesic Forest	2	2	3	2	3	2	3	2	2	1	2		2	1	1	
	Northern Hardwood Swamp	2	1	2	3	2	2	2	2	2		1		2	2	3	
	Northern Mesic Forest (1)	2	2	1	3	2	3	2	3	2	1	1		2	1		
	Northern Wet-Mesic Forest	2	2	2	3	2	3	3	3	2		1			1	2	1
	Northern Wet Forest (2)	2	3	3	3	3	3	2	2	2	1	2		3	3	2	2
Southern Forest Communities	Central Sands Pine – Oak Forest													3	3		
	Floodplain Forest	2		1	2	1	2	1	2	2	2	3	1	3	2	3	1
	Hemlock Relict											3	1	1			
	Pine Relict											3	2	1			
	Southern Dry Forest									1	3	2	2	3	3	2	
	Southern Dry-Mesic Forest						1			2	2	3	2	3	2	3	2
	Southern Hardwood Swamp									1		1				2	2
	Southern Mesic Forest						1		1	2	2	3	2	2	1	2	2
	Southern Tamarack Swamp											2		2	2	3	2
	White Pine – Red Maple Swamp													3			
Oak Savanna Communities	Cedar Glade								2	1	2	3	1	1	1	2	
	Oak Opening										2	3	3		1	3	2
	Oak Woodland										2	3	3	1	1	3	1
Barrens Communities	Great Lakes Barrens	3							1								
	Oak Barrens											3		3	2		
	Pine Barrens			3		1		3				2		3	2		
Grassland Communities	Bracken Grassland					2		3									
	Dry-Mesic Prairie										2	3	3	2	1	3	1
	Dry Prairie										2	3	3	2	2	3	
	Mesic Prairie										3	2	3	1	1	3	2
	Sand Prairie (3)										2	3	1	3	2	1	
	Wet-Mesic Prairie											2	2	1	3	3	3
	Wet Prairie										1	2	1	1	2	2	2
Open and Shrub Wetland Communities	Alder Thicket	2	2	2	3	2	2	2	1	1	1	2		3	2	2	
	Bog Relict									1		1			2	3	2
	Boreal Rich Fen				2	2		2	3								
	Calcareous Fen (Southern)											1		1	3	3	2
	Coastal Plain Marsh													2	3		
	Ephemeral Pond	1	1		3	2	2	1	2	2	1	2	1		1	2	2
	Interdunal Wetland	3							1	2							
	Northern Sedge Meadow	2	3	3	3	3	2	2	3	2	1	2		3	2	2	
	Open Bog (4)	3	3	3	3	3	2	2	1	1				3	2		
	Shore Fen	3							2								
	Shrub Carr	2	1	1	2	2	2	1	3	2	1	3	1	3	3	3	2
	Southern Sedge Meadow						1		2	2	1	2	1	2	3	3	2

Table 2-2. Continued.

		Superior Coastal Plain*	Northwest Lowlands	Northwest Sands*	North Central Forest*	Northern Highland*	Forest Transition*	Northeast Sands	Northern Lake Mich. Coastal*	Central Lake Mich. Coastal*	Western Prairie	Western Coulee and Ridges*	Southwest Savanna	Central Sand Plains	Central Sand Hills*	Southeast Glacial Plains	Southern Lake Mich. Coastal
Aquatic Communities	Emergent Aquatic	3	2	3	3	3	2	2	3	2	3	3	1	2	3	3	2
	Emergent Aquatic-Wild Rice	3		3	2	3	1	1	1	1	1	2		1	1	2	
	Submergent Aquatic	3	2	3	3	3	2	2	2	2	2	3	1	2	2	2	1
	Submergent Aquatic-Oligotrophic Marsh			1		3											
Miscellaneous Communities	Algific Talus Slope											3					
	Alvar								1	3							
	Bedrock Glade		1		3	1	2		1	2	2	3		1	2		
	Bedrock Shore	2															
	Clay Seepage Bluff	2							2	2							2
	Dry Cliff	3	1		3		2	2	3	3	2	3	2	3	1	3	1
	Forested Ridge and Swale	1							3	3							
	Great Lakes Alkaline Rockshore								3								
	Great Lakes Beach	3							3	3							1
	Great Lakes Dune	3							3	3							2
	Inland Beach			3	1	2		1						1			
	Moist Cliff	3	1		3		2	2	2	2	2	3	2	2	2	2	1
Hydrologic-Based	Coldwater streams	3	1	2	3	2	3	3	1	1	3	3	2	2	3	1	
	Coolwater streams	3	2	2	3	3	3	3	2	2	3	3	2	2	2	2	1
	Lake Michigan								3	3							3
	Lake Superior	3			1												
	Impoundments/Reservoirs	1	1	2	3	2	3	2	2	1	2	1	1	3	3	3	2
	Inland lakes	1	1	3	3	3	2	2	2	1	1			1	3	3	2
	Warmwater rivers	2	3	2	3	3	3	3	3	3	3	3	1	2	3	3	2
	Warmwater streams	3	2	3	3	3	3	1	3	3	3	1	3	2	2	3	3
3	Major Opportunity - A major opportunity for sustaining the natural community in the Ecological Landscape exists, either because many significant occurrences of the natural community have been recorded in the landscape or major restoration activities are likely to be successful maintaining the community's composition, structure, and ecological function over a long period of time.																
2	Important Opportunity - Although the natural community does not occur extensively or commonly in the Ecological Landscape, one to several significant occurrences do occur and are important in sustaining the community in the state. In some cases, important opportunities may exist because the natural community may be restricted to just one or a few Ecological Landscapes within the state and there may be a lack of opportunities elsewhere.																
1	Present - The natural community occurs in the Ecological Landscape, but better management opportunities appear to exist in other parts of the state.																
Blank	Absent - The natural community is not known to occur in the Ecological Landscape.																
*	Indicates that the Ecological Landscape has not been comprehensively inventoried or that additional data are needed and that there is incomplete knowledge of what community types exist in the Ecological Landscape.																